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NORMAN CRIDDLE

In the passing of Norman Criddle in his fifty-eighth year, the Entomological Branch of the Dominion Department of Agriculture lost a most valuable officer, the Province of Manitoba a noteworthy citizen, and Canada at large a naturalist of distinction. His devotion to the study of natural history, particularly to entomology, contributed in a marked degree to the material welfare of the Prairie Provinces.

During recent years Norman Criddle has not enjoyed very good health. His condition became alarming about the middle of April and he was forced to go into a hospital at Brandon on April 19. An operation was considered advisable and, after a short rest, this took place on April 28. Following the operation he improved for some days in a manner considered satisfactory to his doctors. Unfortunately, however, on May 3, he developed an acute attack of influenza which, owing to his depleted constitution, he was unable to throw off.

His death on May 4, 1933, came as a great shock to his many friends, colleagues, and fellow entomologists not only throughout Canada but elsewhere as well.

His decease was felt as a real calamity to the Dominion Department of Agriculture, particularly the Entomological Branch of which he was a Senior and outstanding official, to the agricultural industry of the Prairie Provinces in the service of which he laboured so successfully, and to the science of natural history to which he had made important contributions.

Norman Criddle was a man of great kindliness, modesty and quiet, persistent industry, endowed with an artistic temperament and a love of music. He was equipped with a remarkable biological judgment which was controlled by study and guided by a great breadth of mind nurtured upon wide and thoughtful reading in science, literature and art. He was regarded with affection and admiration by his friends, colleagues and fellow scientists, and his personality was accorded the respect of even the most casual acquaintance.

Mr. Criddle was born at Addlestone, Surrey, England, on May 14th, 1875, and with his parents came to Manitoba in 1882. The family settled on a homestead near Aweme about 25 miles south of Brandon. His early education was received from his father and mother, both of whom were highly educated. Until about 1905 he lived continuously at Aweme and assisted generally in the work of the farm. In early July, 1900, the late Dr. James Fletcher, then Dominion Entomologist, investigated an important outbreak of grasshoppers in southern Manitoba and in the course of his travels visited Aweme and spent the night of the 2nd at the home of the Criddles. Fletcher not only had a remarkable knowledge of natural history subjects generally, but he had in addition a most fascinating way of disseminating interesting information. Those who were fortunate enough to know Fletcher will appreciate the great pleasure Norman Criddle must have experienced on meeting him. From that time on the latter was a

constant correspondent of the federal entomological service and there developed a real friendship between these two naturalists. Fletcher well appreciated the wide knowledge that Norman Criddle had acquired of insects and plants and recognized at once his skill in drawing even at this stage of his career.

Early in 1905, Norman Criddle was called to Ottawa to complete coloured drawings of weeds and weed seeds for a publication by the Dominion Department of Agriculture, entitled, "Farm Weeds," by George H. Clarke and James Fletcher.* Soon after his arrival in Ottawa he attended a meeting of the entomological section of the Ottawa Field-Naturalists' Club at the home of the Senior author on January 19th, 1905. This was his first attendance at a meeting of the Club and on this occasion he entertained the members with a description of the physical nature of that part of Manitoba in which he lived and directed attention to the exceptionally suitable character of the locality for the collection of insects and plants.

During the years 1906-1910 he was engaged by the Dominion Seed Commissioner to collect weed seeds which were used for the preparation of reference collections supplied to seedmen. In this work he was assisted by his brothers, mainly Evelyn and Stuart. In the winters of 1910-1913 he was employed as a Seed Analyst by the Dominion Seed Branch with headquarters at Calgary, Alberta.

In the summer of 1913, Mr. Criddle was employed by the Division of Entomology of the Experimental Farms Branch as a temporary Entomological Field Officer for Manitoba. This position was made permanent on April 1st, 1914. In the reorganization of the federal entomological service of 1919, Mr. Criddle's title was changed to that of "Entomologist." This position he held until his death.

Mr. Criddle's skill in drawing not only served as a wonderful medium for illustrating his own publications throughout his productive career but in addition to the coloured plates which were prepared for illustrating "Farm Weeds," he also prepared twenty-seven coloured drawings for a departmental publication issued in 1913, "Fodder and Pasture Plants," by George H. Clarke and the late M. O. Malte.

Although Mr. Criddle's later work and that of greatest economic significance was concerned chiefly with grasshoppers and their control, his interest was in no sense confined to entomology and embraced in addition a range of natural history subjects such as, flowering plants, wild life as commonly understood, mammals and birds. All his investigations were carried on as a continuous study, in fact as parts of the whole web of prairie animal life of which even the human population ranked as but one of the important constituents. The essential unity of his biological cosmos is very clearly shown by the dating of his publications (see appended list), in that from 1904 on, no subject of major interest is ever far from print. It is part of the scientific tragedy that an urgent pre-occupation with the necessary duties as a field entomologist prevented his putting on record more of the great wealth of biological knowledge which his life of observation and study had stored in note and mind. Without question there was still in reserve a fund of information equal to that which

*Published first edition in 1906; second edition 1909.

he has left us.

His interest in entomology was of very long standing and was fundamentally philosophical. Throughout, the strictly biological was inextricably interwoven with the economic and any knowledge secured was always used in the service either of man or animal or both.

His first entomological publication was in 1907 upon tiger beeties. However, even by 1901 the economic aspect of the subject had caught his attention and in that year he invented and with his neighbors demonstrated the value of the "Criddle Mixture" in grasshopper control as a substitute for the "bran bait" for use by the individual farmer. Though not definitely attached to the federal entomological service, he continued his studies of insects along with other natural history studies and, by 1914, when he took up this branch of science professionally by joining the Entomological Branch he had already accumulated a vast store of information and had published eight papers which included both studies of particular insects and general appraisals of the insect situation over wide areas. After 1914, with his attention definitely directed to insects as his major concern his knowledge and influence in prairie entomology were soon felt and papers by Norman Criddle were watched for with increasing interest and respect till the day of his death.

It was in relation to the grasshopper problem that his most comprehensive work was accomplished. The study was pursued throughout his entire career and the total result added a priceless record to the fund of knowledge upon this vital problem in prairie agriculture. The life-history and habits of some 70 species of grasshoppers were made known and the identification of most of them was made possible to him in any stage of their life-history. The technical aspects of the study culminated in the papers filed for publication when he died, in one of which the egg-sacs of seventy-two species are described and figured as an aid in classification and identification, and a second, in which the ecological setting and food habits of 80 species are described, while another paper was in course of preparation making for the identification of the eggs from the study of the detail of their surface structure. During the course of these technical studies every shred of knowledge secured was directed towards the control of grasshoppers as a crop pest and Norman Criddle's unquestioned leadership in the technical background for advising in this work throughout the prairie regions stood without challenge. His work, advice and prestige have been the foundation upon which grasshopper control work on the Canadian prairies was built and carried on.

"Norman Criddle's interest in ornithology began when he came to the prairies of Manitoba as a boy. He has told me that he and his brother had no bird books, and so they had to invent names of their own for all the birds they found near their Manitoba home. Another less enthusiastic boy would have done as most boys do, recognized that there were many kinds of birds, nicknamed a few, and let it go at that.

"Not long ago Mr. Criddle was in conversation with a small group of naturalists when the subject of the Cowbird came up, and someone who had no use for this bird because of its parasitic habits spoke his mind to that effect. Mr. Criddle quietly remarked that anyone who had lived with Cowbirds as he

had, and known them intimately, could not help but love them. He then told that when he was ploughing the Prairies with oxen the Cowbirds would be all over the oxen, and all over him all day.

"It seemed that Mr. Criddle, as in this case, always delighted in defending any bird or mammal that was under attack, and he always spoke or wrote his facts from a vast store of knowledge which contained much that the attacker had overlooked.

"For the sake of his great knowledge of wild life in general, and because he never took any but the most carefully balanced and sanest of views on intricate wild life problems, he was for many years a valued representative of the Department of Agriculture at the Provincial-Dominion Conferences of Game Officials, which have been called from time to time over a long period by the Department of the Interior. At these conferences he not only represented his Department faithfully and well, but he made many distinct additions to the programmes from year to year. His level-headed judgment on any problem was always welcomed by the delegates." (Mr. Hoyes Lloyd, June 14, 1933).

"While Norman Criddle did not publish many long papers on mammals, he was a recognized authority on the prairie forms, particularly on life-histories. He was also a frequent contributor to scientific periodicals on ecological subjects, usually containing important data on certain species. He was always very generous in giving notes and observations to other workers who were interested, and on his annual returns to Ottawa after a field season in Manitoba always visited the National Museum to give information on recent developments in mammal and bird life in that Province. He remained a member of the Ottawa Field-Naturalists' Club for half a lifetime, and became a charter member of the American Society of Mammalogists in 1919, retaining his interest until the last.

"The Criddle family were all interested in natural history, and coming to Manitoba in 1882, when Norman was a small boy, he had abundant opportunities to hear the lore of the early days when the mammal life, both game and fur, were the main resources of the country, and to learn from personal observation the important place filled by the smaller mammals in affecting farm life and crops, and the role of the predatory mammals in control of rodent and insect pests. Much of Norman Criddle's work on mammals was done in collaboration with his brother Stuart. They published several papers jointly, and some of Stuart Criddle's papers quote from the observations of his brothers Norman, Evelyn and Talbot.

"Norman Criddle's notes were particularly valuable in recording close observations on the changes and fluctuations of fauna and flora in the same region for over fifty years, from the time when southwestern Manitoba was largely unsettled prairie, to the present era of intensive cultivation, and still more so because he was an all-round naturalist interested in all nature and observed the correlation between the different forms of life." (R. M. Anderson, June, 1933).

Mr. Criddle was a member of several scientific and other organizations, in some of which he took a very active interest. Among these may be listed—the Entomological Society of Ontario, the Ottawa Field Naturalists' Club (past

president), the National Association of Audubon Societies (sustaining member), the American Ornithologists' Union (counsellor and past president), the Manitoba Natural History Society (honourary president), the American Association of Economic Entomologists, the Entomological Society of America, International Great Plains Crop Pest Committee (permanent chairman), the Professional Institute of Civil Servants of Canada, The University Club of Ottawa, and the Ottawa Vegetable Growers' Association (honourary).

On March 1 Mr. Criddle was honoured by the Manitoba Agricultural College in being awarded the honourary diploma in agriculture as a recognition of the service which he had rendered to the province. This well merited public recognition was the occasion for the greatest satisfaction to his host of personal and professional friends.

The place which he took in the opinion of his scientific colleagues was beautifully stated in the following words by one of them when referring to him in a semi-personal communication to the junior writer following Mr. Criddle's death.

"We all had a great admiration for Norman Criddle and those who knew him well enough, a real affection. He was a fine gentleman in the best sense of the word and one of the kindest and most truly modest men I have ever known. There is no doubt in my mind that Criddle was the best informed field naturalist in the whole of Canada. In fact there are few of his type anywhere. His death will leave a gap in the ranks of Canadian naturalists which will probably never be filled by any single man."

At the Entomological Sessions of the World's Grain Exhibition and Conference, July 25, 1933, Regina, Saskatchewan, the first formal meeting of a group of Canadian Entomologists following the death of Mr. Criddle, a resolution moved by Dr. J. R. Parker and seconded by Prof. A. G. Ruggles was unanimously passed to the effect——

"That the delegates assembled at the Entomological Sessions of the World's Grain Exhibition and Conference at their first meeting, July 25, wish hereby formally to express to his immediate relatives the feeling of intense personal and professional loss experienced by all those in attendance at the meetings, in the death of Mr. Norman Criddle.

"Mr. Criddle had for so many years taken so prominent and authoritative a part in all prairie entomological activities that with his passing there has come a unanimous realization of having lost an irreplaceable colleague, friend and leader in the science."

ARTHUR GIBSON.
H. G. CRAWFORD.

LIST OF PUBLICATIONS OF THE LATE NORMAN CRIDDLE

(Many contributions to agricultural papers or newspapers are not included.)

ENTOMOLOGY

1907. Habits of Some Manitoba Tiger Beetles. (Cicindelidae). Can. Ent., 39:105-114.
1910. The Migration of Some Native Locusts. Ann. Rept. Ent. Soc. Ont., 41:60-61.
Habits of Some Manitoba Tiger Beetles. Can. Ent., 42:9-15.
1911. Injurious Insects of 1910. Jour. Econ. Ent., 4:236-241.
1912. Beetles in Relation to Agriculture. Nor'-West Farmer, 31:1593-1595.
Injurious Insects of 1911 at Treesbank, Man. Jour. Econ. Ent., 5:248-252.
Injurious Insects of Southern Manitoba. Ann. Rept. Ent. Soc. Ont., 43:97-100.

Insect migration at Aweme, Man. Ann. Rept. Ent. Soc. Ont., 42:74-76.

1915. Popular and Economic Entomology: 1, Some Inhabitants of a Sand Plain in June. Can. Ent., 47:24-30.
Two Useful Inhabitants of Gardens. Man. Hort., May.
The Hessian-Fly and Western Wheat-Stem Sawfly in Manitoba, Saskatchewan and Alberta. Bul. No. 11, Ent. Br., Dept. Agric. Can.
A Garden Cleanup. Man. Hort., 2, No. 9.

1916. The Western Wheat-Stem Sawfly. Sask. Farmer, Oct., 7:15.
Some stem maggots attacking growing grain. Agric. Gaz., 3:504-507.

1917. Further Observations Upon the Habits of the Western Wheat-Stem Sawfly in Manitoba and Saskatchewan. Agric. Gaz., 4:176-177.
Popular and Practical Entomology: Precipitation in Relation to Insect Prevalence and Distribution. Can. Ent., 49:77-80.
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1918. Popular and Practical Entomology—Light Traps as a Means of Controlling Insect Pests. Can. Ent., 50:73-76.
The Habits and Control of White Grubs in Manitoba. Agric. Gaz., 5:449-454.
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1919. Fragments in the Life-Habits of Manitoba Insects. Can. Ent., 51-97-104.
Locusts in Manitoba with Special Reference to the Outbreak of 1919. Ann. Rept. Ent. Soc. Ont., 50:49-53.

1920. Locust Control in the Prairie Provinces. Cir. No. 13, Ent. Br., Dept. Agric. Can.
Fragments in the Life-Habits of Manitoba Insects, II. Can. Ent., 52:121-125.
Some phases of the Present Locust Outbreak in Manitoba. Ann. Rept. Ent. Soc. Ont., 51:19-23.
The Common Insects and Their Control. In "Crop Production in Western Canada," by John Bracken, Chap. 14, pp. 359-383. The Grain Growers' Guide, Winnipeg.

1921. The Control of Grasshoppers. Crop Prot. Lflt., No. 14, Ent. Br., Dept. Agric. Can.
Some Phases of the Present Locust Outbreak in Manitoba. Ann. Rept. Ent. Soc. Ont., 51:19-23.
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1922. The Western Wheat-Stem Sawfly and Its Control. Pam. No. 10, Ent. Br., Dept. Agric. Can.
Manitoba Grasshoppers. Can. Fld. Nat., 36:41-44, 66-68.
Beetles Injurious to Sunflowers in Manitoba. Can. Ent., 54:97-99.
The Western Wheat-Stem Sawfly in Canada. Ann. Rept. Ent. Soc. Ont., 52:18-22.
The Entomological Record, 1921. Ann. Rept. Ent. Soc. Ont., 52:57-70.

1923. The Hessian-Fly in the Prairie Provinces. Pam. No. 30, N.S., Ent. Br., Dept. Agric. Can.
The Life-History of *Cephus cinctus* Nort. in Manitoba. Can. Ent., 51:1-4.
Superheating for Household Pests. Can. Fld. Nat., 37:52-53.
The Entomological Record, 1922. Ann. Rept. Ent. Soc. Ont., 53:76-90.

1924. Notes on the Early Stages of Grasshoppers. Can. Ent., 51:49-53.
Two Problems in Natural Control. Ann. Rept. Ent. Soc. Ont., 54:16-18.
The Entomological Record, 1923. Ann. Rept. Ent. Soc. Ont., 54:87-102.
Observations on the Habits of *Sphex procera* in Manitoba. Can. Fld. Nat., 38:121-123.

1925. Field Crickets in Manitoba. Can. Ent., 57:79-84.
A new *Cicindela* from the adjacent territory of Montana and Alberta. Can. Ent., 57:127-128.
Lessons From the Grasshopper Outbreak of 1919-23 in Manitoba. Ann. Rept. Ent. Soc. Ont., 55:13-16.
The Entomological Record, 1924. Ann. Rept. Ent. Soc. Ont., 55:89-106.

1926. Notes on the Synonymy of Certain Species of *Physonota*. Can. Ent., 58:207-208.
The Entomological Record, 1925. Ann. Rept. Ent. Soc. Ont., 56:94-107.
Life-History and Habits of *Anabrus longipes* Caud. (Orthoptera). Can. Ent., 58:261-265.
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Lepidoptera reared in Manitoba from poison ivy. Can. Ent., 49:99-101.
The Entomological Record, 1926. Ann. Rept. Ent. Soc. Ont., 57:47-62.

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The Introduction and Establishment of the Larch Sawfly Parasite, *Mesoleius tenthredinis* Morley, in Southern Manitoba. Can. Ent., 40:51-53.

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A. V. Mitchener).

1930. The Life-History of the Cow Grasshopper, *Chrysochraon abdominalis* in Manitoba. Can. Ent., 62:24-28.

1931. Insects of the Season in Manitoba. Ann. Rept. Ent. Soc. Ont., 61:20-23 (with A. V. Mitchener).

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The Correlation of Sun Spot Periodicity With Grasshopper Fluctuation in Manitoba. Can. Fld. Nat., 46:195-199.

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Studies in the Biology of the North American Acrididae. Part 1, The Egg-Sac and Egg. (In manuscript).

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1908. Some Bird Habits. Ott. Nat., 22:153-156.

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A Colony of Cliff Swallows and Others. Ott. Nat., 24:143-145.

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1912. Popular and Practical Ornithology: 2, the Marsh Hawk. Ott. Nat., 25:147-151.

Popular and Practical Ornithology: 3, the Upland Plover. Ott. Nat., 26:61-65.

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1917. Horned Larks at Aweme, Man. Ott. Nat., 30:144-148 (with Stuart Criddle).

The American Crow in Relation to Agriculture. Agric. Gaz., 4:446-450.

The Red-Tailed Hawk in Manitoba. Ott. Nat., 21:74-76.

1918. The House Sparrow and Brown Rat in the Prairie Provinces of Canada. Agric. Gaz., 5:348-349.

1919. Birds in Relation to Sunflower Growing in Manitoba. Can. Fld. Nat., 33:90-92.

1920. The Birds of a Manitoba Garden. The Western Gardener, 5: Feb.

Notes on the Nesting Habits and Food of Prairie Horned Larks in Manitoba. Can. Fld. Nat., 34:14-16.

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1927. A Calendar of Flowers. Can. Fld. Nat., 41:48-55.

MAMMALOGY AND WILD LIFE

1906. The Fly Agaric *Amanita muscarda* and How It Affects Cattle. Ott. Nat., 19:203-204.

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1922. The Relation of Wild-Life to Agriculture. Can. Fld. Nat., 36:47-49.
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1925. Weasels of Southern Manitoba. Can. Fld. Nat., 39:142-148 (with Stuart Criddle).
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MISCELLANEOUS

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1927. Book Review—Report of the Game Commissioner for Saskatchewan. Can. Fld. Nat., 45:20-21.
1929, Obituary—Hugh McKellar. Can. Ent., 61:288.
Book Review—A Manual of External Parasites by H. E. Ewing. Can. Fld. Nat., 43:190.
1930. Book Review—Insects, Ticks and Venomous Animals of Veterinary and Medical Importance. Can. Fld. Nat., 44:169-170.
1931. Obituary—James H. Emerton. Can. Fld. Nat., 45:90.
1932. Book Review—Common Pests, etc. Can. Fld. Nat., 46:193-194.

NOTES ON NORTH AMERICAN LEPIDOPTERA WITH DESCRIPTIONS OF NEW SPECIES*

BY J. MCDUNNOUGH,
Ottawa, Ontario.

NOCTUIDAE.

Agrotis mollis Wlk.

Agrotis mollis Walker, 1856, Cat. Lep. Het. Brit. Mus. X, 333.
Agrotis fernaldi Morrison, 1875, Proc. Acad. Nat. Sci. Phil. 429; Grote, 1882, Ill. Essay, 53, Pl. I, fig. 11.
Euxoa mollis Hampson, 1903, Cat. Lep. Phal. Brit. Mus. IV, 272, Pl. LXV, fig. 4; McDunnough, 1929, Bull. 55, Can. Nat. Mus. 74.

This species, which in all the later lists has been placed in the genus *Euxoa*, will have to be transferred to *Agrotis* on the strength of the male genitalia which are typical of this latter genus; the front, furthermore, is only slightly bulging and roughened and does not show the tubercle with raised edges characteristic of most of the *Euxoa* species. The rough, hairy squammation may be matched by several species included in *Agrotis* in my revision (1929, Bull. 55, Can. Nat. Mus. 34) but the fasciculate male antennae are only duplicated by *vetusta* Wlk. and the forewings are shorter and broader than usual. There appear to be no very close relatives.

Agrotis dolli Grt.

When preparing my generic revision of Agrotids I was unable to examine a specimen of this species; it was therefore not mentioned in my text but left, in my list of species (p. 75), in its usual place next to *daedalus* Sm. Since then I have received two males from Presidio, Tex., one of which has been kindly identified for me by Mr. F. H. Benjamin, of the United States National Museum, as this species. The proper generic position for the species is rather doubtful; in my key it would run to *Protogygia*, due to the lack of the fourth row of tarsal spines found in *Agrotis;* this same feature would preclude placing in *Onychagrotis* where is would otherwise fall quite well on account of the rather short and

*Contribution from the Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa.

thickened fore tibia with strong spining. The genitalia are quite typical of *Agrotis* as far as the clasper and harpe are concerned; however, the clavi are better developed than in this genus, although scarcely as strong as in *Protogygia,* and the aedoeagus is quite short and chunky, without any armature of the vesica, differing therefore from both these genera in this respect. It might be as well to leave the species as it stands in *Agrotis* for the present until more study has been made of the neotropical species.

Proragrotis dubitata n. sp.

Palpi rather weak, upturned, creamy, shaded with smoky. Male antennae weakly serrate and fasciculate. Front with a prominent central projection, oval, with truncate apex, the edges of which are slightly raised above central portion; sides of front with raised ridges, not connected transversely below central projection as in *longidens* Sm. Vestiture of head and thorax scaly, an admixture of creamy and light brown; collar in apical half crossed by two deep brown lines and patagia partially bordered with deep brown, considerably suffused with whitish scaling, especially along costa and inner margin. Ordinary transverse lines obsolete; claviform long, narrow, whitish, outlined finely with black and connected to base of wing by a black basal streak; orbicular whitish with a small central brownish spot, partially and finely outlined with black, open towards costa, forming a long, decumbent oval, the apex of which nearly touches the reniform; reniform rather small, lunate, whitish, with central brown filling and with a narrow black border on the side facing the orbicular; ground color between and below these two spots decidedly brown. Veins very finely brown. S. t. line represented by a series of intravenular deep brown arrow-like dashes of which the two opposite cell and the one above tornus are longest; these dashes are faintly tipped outwardly with whitish, especially the one at tornus. Terminal area, except at apex, without the white shading found in the subterminal area; costa with several minute pale dots before apex. Fringes light brown with a paler admixture and checkered with deeper, smoky brown. Secondaries pure white in male, with faint terminal smoky shading in female; a faint dotted, brown terminal line in both sexes. Beneath primaries whitish with slight smoky tinged and checkered fringes; secondaries white, slightly sprinkled with white along costa. Expanse 31-35 mm.

Holotype— ♂, Mescalero Indian Reserve, Otero Co., N. Mex., 7000 ft. June-July (O. Poling); in United States National Museum, ex Coll. Barnes.

Allotype— ♀, Springerville, Ariz., July 23, 7300 ft. (E. R. Tinkham) · No. 3631 in the Canadian National Collection, Ottawa.

Paratype— ♀, same data as allotype and in same collection.

The species is only provisionally placed in *Proragrotis*; the frontal prominence differs in several respects, as already noted, from that of the genotype, *longidens* Sm.; the fore tibiae are short and broad, shorter than the first tarsal joint; they are spined on both sides and the terminal spine on the inner side is enlarged to form a distinct claw, that of the outer side being shorter and weaker; in *longidens* there are four (two on each side) almost equally stout, terminal claws. There is no fourth row of tarsal spines as in *longidens*.

Graphiphora bollii Grt.

Agrotis hilaris Grote (nec Frr.), 1880, Can. Ent. XII, 153.
Agrotis bollii Grt., 1883, Bull. U. S. Geol. Surv. VI, 160.

Epipsilia bollii Barnes & Benjamin, 1923, Contr. V, (3) 115.

When reviewing the Agrotid genera (1929, Bull. 55, Can. Nat. Mus.) I was unable to place this species definitely owing to lack of material, but hinted, however (p. 20) that it might fall near *badinodis* Grt. I have since received a small series from Arkansas, taken in early November (the late date probably accounting for the rarity of the species in collections), and believe that the placement in Group III of *Graphiphora* between *badinodis* and *collaris* to be the most suitable position for *bollii*. The genitalia show several points of similarity to those of *collaris*, notably in the shape of the harpe and the thin uncus; the papal squammation as well as the general type of maculation also indicate a similar relationship.

Polia tristis B. & McD.

In a male specimen before me of this species from Springerville, Ariz. (E. R. Tinkham), identified for me by F. H. Benjamin, I find that the mid and hind tibiae are weakly spined and that on this character the species would fall into the *Trichorthosia* group of Agrotids. I hesitate, however, to make this change both on account of the general appearance of the species being decidedly *Polia*-like and also because the genitalia have little of an Agrotid character, the apical portion of the clasper showing a decided tendency to the battledore shape so often found in the Hadeninae. For the present no harm is done in leaving *tristis* as a *Polia*.

Oncocnemis tinkhami n. sp.

Palpi creamy white, shaded outwardly with smoky brown; head and thorax deep creamy; pectus shaded with smoky at base of eyes; abdomen thinly scaled with creamy over a dark base. Primaries with the basal fourth of wing deep creamy with a small blackish dot on costa at base; median area deep blackish, the inner edge (representing the t. a. line) evenly and gently concave, the outer edge (t. p. line) bulging over the cell, then incurving gently and slightly dentate on the cubital veins, defined outwardly by a narrow difuse creamy shade; terminal area beyond this pale shade entirely blackish, similar in color to median area. Reniform and orbicular faintly indicated on the dark median area by pale, diffuse outlines, the former small, narrow, slightly oblique, the latter also small and roughly circular (sometimes absent). Fringes white with slight dark scaling in basal half. Secondaries white with a moderately broad smoky terminal band, slightly shaded with pale towards anal angle; a postmedian line is indicated by dark dots on the veins, most pronounced towards anal angle. Fringes white. Beneath primaries silky whitish, tinged with smoky, especially terminally, with indications of the maculation of the upper side; secondaries much as above. Expanse 30 mm.

Holotype— ♂, Presidio, Tex., Nov. 26, (E. R. Tinkham); No. 3629 in the Canadian National Collection, Ottawa.

Allotype— ♀, same locality, Nov. 24.

Paratypes—2 ♂, same data, Nov. 14, 24; one of these deposited in the United States National Museum.

The species is evidently allied to *deceptiva* B. & L. but the pale front and rather striking maculation of wings should render it easily separable. The genitalia are quite similar to those of *deceptiva* but the clasper is not broadened out apically with an upcurved costal margin and the corona is weaker; the harpe

is narrower and the portion below the apical hook is less sharply truncate, the bulge, in consequence, being less prominent. I take pleasure in naming the species after the collector, Mr. E. R. Tinkham, who has sent me some most interesting material from this region.

Oncocnemis modesta n. sp.

Palpi creamy; front brown; some smoky shading on the pectus below the base of the eyes; head and thorax creamy with a slight pinkish suffusion on the latter; abdomen scaled with white over a dark base. Primaries with the basal two-thirds creamy with a slight ochreous tinge; inception of ordinary lines indicated by three small, smoky, equidistant, costal patches; t. a. line scarcely discernable, indicated more by the paler filling than by any dark lines, in direction rather sharply outwardly oblique, somewhat lunulate. Ordinary spots indicated faintly by their pale whitish color on a somewhat deeper background; orbicular decumbent, oval; reniform upright, almost circular. Terminal third of wing deep slaty black, with traces of a pale, whitish, irregular, s. t. line crossing the area close to outer margin. Fringes an admixture of whitish and pale smoky scaling with a more distinctly ochreous line at base. Secondaries white with a broad smoky terminal border, narrowing towards anal angle to a point; no trace of postmedian line. Fringes white, tinged with smoky in basal half. Beneath white with the dark border of upper side repeated on both wings. Expanse 29 mm.

Holotype— ♂, Presidio, Tex., Oct. 27, (E. R. Tinkham); No. 3630 in Canadian National Collection, Ottawa.

This species is even more closely allied to *deceptiva* B. & L. than *tinkhami* is; it shows however much less maculation than this species in the basal and median portions of the wing. In the genitalia the apical portion of the clasper is much as in *tinkhami* and is without the upward bend of costa found in *deceptiva*.

Homoglaea johanseni Gibson

The species is misplaced in this genus. According to male genitalia it would fall into the *Agroperina-Trichoplexia* group of the Acronictinae; in all essential characters the genitalia are strikingly similar to those of *maillardi* Geyer (probably wrongly placed in *Eremobia*) and for the present I am placing it next to this species; the condition of the type makes it impossible to determine accurately the nature of the thoracic and abdominal tufting.

Calamia basistriga n. sp.

Palpi brown with an admixture of black hairs. Head and thorax clothed with long brown hair. Primaries rather evenly deep brown with (generally) a decided ruddy tinge; the cubital vein and the basal half of veins 3 and 4 are distinctly whitish; under a lense a trace of white scaling may be detected on the radial vein to end of cell, the basal half of 2, and on vein 1; in the terminal area all veins are faintly marked with black. The costal sides of the cubital vein and vein 4 are shaded diffusely with blackish, this streak not attaining, however, the terminal margin. There is a distinct *short black basal streak* below cubital vein and a slight blackish shade in the fold below the origin of vein 2. A black terminal line, broken opposite the vein-endings by ochreous spots. Fringes smoky ochreous, slightly cut by pale ochreous. Secondaries *very deep smoky*, scarcely paling basally, with pale grayish fringes, cut by a smoky line basally. Beneath pale smoky with a small discal dot and a terminal row of dark

dots on both wings. Expanse 25 mm.

Holotype—♂, Lethbridge, Alta., Aug. 30, 1922, (H. L. Seamans); No. 3633 in the Canadian National Collection, Ottawa.

Paratypes—3♂, Head of Pine Creek, Calgary, Alta., Sept. 3, 5, 8, (F. H. Wolley-Dod); 3♂, Nordegg, Alta., Sept. 4, 18, 20, (K. Bowman); 1♂, Indian Head, Sask., Sept. 6, (J. J. de Gryse).

This species has long been confused with *variana* Morr, but after a careful reading of Morrison's description I have come to the conclusion that it cannot possibly apply to the present species; *variana* must come very close to *inquinata*, if indeed it is not a synonym. In any case neither *variana* nor *inquinata* possess the black basal streak on primaries, and have further much more distinctly pale venation and paler secondaries.

Numeria inceptaria Wlk.

In my notes on Walker's types in the D'Urban Collection (1916, B. & McD., Contrib. III (1) 37) I stated that the type label of *inceptaria* had been obviously misplaced and that for the present it was impossible to determine just what species the name represented. Recently I have had occasion to carefully revise the D'Urban Collection and find among the material a male specimen of the Deltoid, *Philometra metonalis* Wlk., which fits in excellently with Walker's diagnosis of *inceptaria* and which I have every reason to believe was the original type specimen on which the name was based; the name *inceptaria* Wlk. will, therefore, sink to *metonalis* Wlk., and the doubt attending the identification be satisfactorily cleared up. It might also be noted that, according to the type specimen, the name *Hormisa effusalis* Wlk. at present sunk as a synonym of *Camptylochila acmula* Hbn. must be transferred as a synonym of *metonalis* Wlk.

GEOMETRIDAE.

Xanthorhoe labradorensis Pack.

Coremia labradorensis Packard, 1867, Proc. Bost. Soc. Nat. Hist., XI, 46.

This species, described from Caribou Is., Labrador, has long been listed as a variety of *munitata* Hbn. following Packard's own later association (1876, Mon. Geom., p. 137). On turning to the original description, however, we find that the opening sentence states—"Allied to *C. propugnata* (*designata*) but the antennae are much more finely ciliate." This at once precludes all association with *munitata* which has distinctly pectinate antennae as noted by Packard in his description of *strigata* Pack. on page 50 of the same paper, a species now correctly sunk to *munitata*.

In working over some recently collected material I came across a male from Bobcaygeon, Ont., captured by myself on July 3, 1931, in which the antennae were distinctly more finely ciliate than our North American *designata emendata* Pears. Further search brought to light another similar male from Kearney, Ont., taken by F. P. Ide, on July 8, 1926, and a female which appears to be correctly associated from Minaki, Ont., collected by myself on July 7, 1928. As these specimens fit in quite well with the remainder of Packard's description I propose to regard them as representing the true *labradorensis* which I consider to be a perfectly good species. As stated, *labradorensis* bears considerable resemblance to *designata*, notably in the dark smoky inner border of the median brown band; this band, however, in the three specimens before me shows none of the pinkish suffusion so characteristic of our Canadian race of *designata* but

is rather even chestnut-brown and somewhat narrower than in this latter species; the wing expanse is only 20-21 mm. as compared with 21-23 mm. for *designata*. Finally the male genitalia show definite characters when compared with those of *designata;* the free costal projection is shorter and does not exceed the apex of the clasper nor is there any trace of the subapical spine of the clasper; the aedoeagus is very thin and narrow as compared with the chunky one of *designata* and the armature of the vesica consists of a thin bundle of a few long cornuti as compared with the two stout bundles of short cornuti found in *designata emendata;* other minor differences are present but the above-mentioned are the most striking.

PTEROPHORIDAE.

Pterophorus cygnus B. & L.

Pterophorus cygnus B. & L., 1921, Cont. Nat. Hist. Lep. N. Am. IV (4) 304, Pl. XLIX, fig. 2; McDunnough, 1923, Can. Ent. LV, 85.

In 1923, when working over the species of *Pterophorus,* I suggested that Lindsey in his revision had interchanged the slides of genitalia of *tenuidactylus* Fitch and his new species *cygnus;* not having any material before me which agreed with Lindsey's conception of *tenuidactylus,* as based on his genitalic figures, I let the matter rest for the time being. Recently, however, I came across a specimen which fits in excellently with Lindsey's figure (Pl. LXIX, fig. 1) and being desirous of settling the question, I took up the matter with Mr. A. Busck of the U. S. National Museum where the type of *cygnus* B. & L. now rests. Mr. Busck has summed up the matter in his usual clear and concise manner and I cannot do better than quote his conclusions:—

"With regard to your queries about *Pterophorus tenuidactylus* Fitch and *P. cygnus* B. & L. I opine that the muddle began with Fernald and has been augmented by every subsequent treatment as follows:"

"1. Fernald definitely states that his genitalia figures were made from Fitch's type specimen. That fixes the species. He also correctly made *nigrociliatus* Zeller a synonym. An authentic Zeller specimen in his collection, now in U. S. N. M. has the same form of genitalia."

"2. Fernald later erroneously identified Saunders' and Forbes' blackberry *Pterophorus* as Fitch's species. The blackberry species is quite distinct and its genitalia are represented in Lindsey's figure 1 on his Plate 49, which he also mistakenly calls *P. tenuidactylus.* The blackberry species with these genitalia requires a name and I suggest you supply it."

"3. Lindsey describes and figures the true *tenuidactylus* as a new species, *P. cygnus,* which name consequently falls as a synonym."

"4. McDunnough, realizing something wrong, attempts to explain it by a mixup in Lindsey's slides—quite unwarranted as both specimens and slides are very plainly numbered correspondingly. But he assigns the name *tenuidactylus* correctly and reestablishes the authority of

the original Fernald genitalia figures."

Under the circumstances I agree with Mr. Busck that *cygnus* B. & L. will unfortunately have to fall into the synonymy of *tenuidactylus* Fitch. The species without a name I have much pleasure in dedicating to Mr. Busck as follows:

Pterophorus buscki n. sp.

Male. Practically similar in size, color and maculation to *tenuidactylus* Fitch; the brown color is slightly paler than in this latter species and the white markings on the fourth and fifth abdominal segments somewhat less diffuse. A useful (possibly not always constant) character is found in the second lobe of the forewing which in the present species is somewhat broader apically with a less produced tip; in consequence the outer margin is less oblique and the excavation tends to be more oval in character and not elliptical as in *tenuidactylus*. The genitalia are quite distinctive and as in Lindsey's figure, Plate XLIX, fig. 1, the claspers being somewhat asymmetrical apically.

Holotype— ♂, Go Home Bay, Georgian Bay, Ont., July 11, 1932, (G. S. Walley); No. 3628 in the Canadian National Collection, Ottawa.

I propose to regard as a paratype the male in the U. S. National Museum (ex Coll. Barnes) from which Lindsey's slide (Pl. XLIX, fig. 1) was made and concerning which he gives no data in his revision.

According to Mr. Busck the larva of the present species is a blackberry feeder; *tenuidactylus* has been bred at Waterton, Alta. by myself from larvae found on *Rubus parviflorus* Nutt. and there are specimens before me from Duncan, B. C. bred from strawberry.

PHYCITINAE.

Acrobasis rubrifasciella Pack.

Syn. Acrobasis alnella McD., 1922, Can. Ent. LIV, 36.

A study of male genitalia based on bred series of *Acrobasis* from birch, alder, *Myrica* and sweet fern convinces me of the above synonymy. I find that at the time I described *alnella* I had misidentified *rubrifasciella*, having actually specimens of the very similar *comptoniella* under that name; in *rubrifasciella*, the alder feeder, the wine-red band beyond the scale patch is neither so constant nor so bright as in this latter species. The three species *betulella* Hlst., *rubrifasciella* Pack. and *comptoniella* Hlst. can be readily distinguished on genitalic characters, notably the size of the lateral, wing-like extensions of the gnathos; the larvae of the latter species occur apparently both on *Myrica* and sweet fern, specimens reared from larvae on these two plants having similar genitalia.

EUCOSMIDAE.

Epinotia myricana n. sp.

Palpi head and thorax brown. Primaries almost unicolorous brown with slight purplish shades, costal fold in male narrow, extending to about one-third of wing length; pattern very indistinctly marked in somewhat darker shade without purplish tinges, consisting of a large basal patch with prominent outward angle in the cell, an oblique band from centre of costa, not attaining anal angle, a small subapical patch and several minute spots in apical section of costa. Fringes unicolorous with wing. Secondaries dirty whitish with brownish terminal shading, especially at apex. Beneath primaries smoky with pale costa and outer margin; secondaries much as above. Expanse 16 mm.

Holotype—♂, Bobcaygeon, Ont., July 9, (J. McDunnough); bred from *Myrica;* No. 3609 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, July 10.

Paratypes—9♂, 9♀, same data, July 2-27; Aug. 9 (1♀); one pair deposited in United States National Museum.

The color of the primaries varies considerably from quite pale to deep brown without, however, any smoky shades. The pattern is best defined in the paler individuals and very similar to that found in some of the unicolorous forms of *solandriana* L. The species indeed falls into this same group, the male genitalia being very similar to those of *solandriana* as figured by Heinrich. In the present species, however, the aedoeagus appears to lack cornuti and the portion of the clasper beyond the basal emargination on the ventral side is much longer and more evenly rounded apically than in *solandriana;* the spining of this area is also slightly less heavy. The smaller size and paler hind wings distinguishes the adult from that of *solandriana*. The larva will be treated of in another paper.

I am indebted to Mr. C. Heinrich of the United States National Museum for his examination of specimens and suggestions as to the correct placing of the species.

TORTRICIDAE.

Peronea cornana n. sp.

Head, thorax and primaries light olive-gray (when alive decidedly greenish-gray). Primaries with tufting minute and maculation very obscure with the exception of a large purplish-black triangle situated in the mid-section of the costa and extending to near apex of wing; this triangle shows slight pale suffusion in its central section and contains five equally spaced darker spots along its costal edge; between the apex of this triangular patch and the anal angle there is an obscure olivaceous patch (not always present), slightly darker than the ground color of wing, and there are similarly colored streaks in the basal and apical areas, all, however, generally very obscure. An oblique row of minute black tufts extends along the inner edge of the dark triangle, terminating in two slightly larger tufts situated immediately below apex of triangle, these latter being edged with pale scaling; another oblique row of similar black tufts extends from the third dark costal spot in the triangle to a point slightly below the middle of the outer margin, following somewhat irregularly the course of one of the olivaceous striae mentioned above; several scattered black points above inner margin just before anal angle and a more prominent black scale tuft just below fold at about one-third from base with two black points above it in the cell nearer base of wing. A very few scattered ruddy scales, mostly in median area of wing. Fringes light gray, paler outwardly. Secondaries pale smoky with lighter fringes. Expanse 13-15 mm.

Holotype—♂, Bobcaygeon, Ont., June 21, 1932, (J. McDunnough), bred from larva in a rolled *Cornus* leaf; No. 3632 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, June 26.

Paratypes—10♂, 20♀, all bred from larvae on *Cornus* at Bobcaygeon between June 20 and 29, 1932; a pair of these deposited in the United States National Museum.

Mr. A. Busck of the United States National Museum, to whom I submitted specimens for determination, informs me that the species is new and has asked me to describe it.

The above description is based on a well-marked specimen; in other specimens there is a tendency for the dark costal triangle to become paler, at times scarcely darker than the surrounding area. The tufting, never at any time very strong, may also become obsolescent.

According to the male genitalia the species belongs in the *cervinana-hcindelana* group and the claspers are very similar in shape to those of *cervinana* as figured by Busck (1920, Cont. N. Hist. Lep. N. Am. IV (3), Pl. 32, fig 7). The socii, however, are *decumbent* or drooping (not erect as in *cervinana* and allies), the subanal prominence is *much reduced* and there is *no subapical lateral thorn* or spine on the aedoeagus. The armature of the vesica consists of *four equal spines*, two situated apically, one above the other, the other two more closely together in the middle section and tending occasionally to split into three spines. In the female the genital plate is roughly quadrangular with the lobes quite short and bluntly pointed; the ostium is circular with slightly raised edges; the ductus bursae is narrowed in its lower portion, shortly before the opening, and shows a slight chitinous thickening; the signum is stellate.

Besides the type series I have specimens before me from Aweme, Man., collected in early October by N. Criddle, which are rather larger than the types but agree in genitalia; also several specimens taken in early spring (April) at Aylmer, Que. I expect to deal more fully with the larva in another paper.

A NEW FLEA-BEETLE FROM IOWA (SUBFAMILY HALTICINAE, FAMILY CHRYSOMELIDAE)

BY GEO. M. STIRRETT

Dominion Entomological Laboratory, Chatham, Ontario.

Haltica nancyae n. sp.

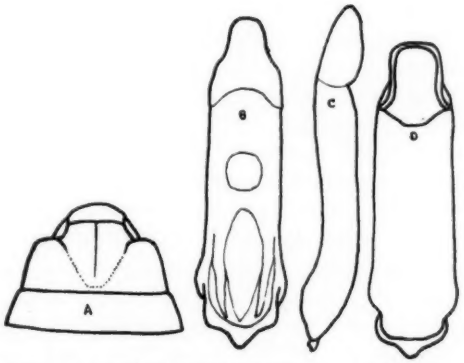
Form elongate oval, moderately convex. Colour bright blue-green with slight iridescence, purplish reflections predominant, shining. Antennae and legs rufotestaceous. Thorax and elytra finely but distinctly punctured, distinctly alutaceous.

Male—Length 3.7 mm., width 1.7 mm. Maxillary palpus with terminal segment conical, rufotestaceous. Labrum rectangular, lower margin broadly emarginate, bearing six setae, rufotestaceous. Mandibles rugged but not prominent, rufotestaceous bases fuscous. Postclypeus with slight lateral carinae which are continuous with prefrontal carina, greenish. Prefrontal carina well elevated, greenish, aenescent. Frontal tubercles prominent, orbicular, smooth, shining, green. Canthus about .1 mm. in width, smooth except for five or six punctures. Supratubercular sulca well marked. Supraorbital punctures prominent. A deep concavity at juncture of supratubercular and juxtaocular sulca, punctured. Postfrons slightly convex, finely wrinkled, especially with concentric wrinkles surrounding a short depression extending into postfrons between frontal tubercles, green with brassy reflections. Eyes convex, golden-brown in death, interocular space .55 mm. in width; width of each eye .15 mm.

Antennae a little longer than one-half length of body. Joints 2-11 gradu-

ally increasing in thickness, joint 2 distinctly shorter than 3, 3 and 4 subequal, rufotestaceous, clothed with white hair, apical third of joints 5-11 fuscous.

Prothorax about twice as wide as long, base slightly wider than apex. Antebasal transverse impression almost obliterated. A very faint shallow concavity on disk each side of middle. Hind margin slightly sinuate. Finely but distinctly punctured. Distinctly alutaceous. Bright blue-green, shining, very slightly aeneous. Margins atropurpureous. Scutellum with apex rounded, atropurpureous.



Haltica nancyae Stirrett. a, terminal ventral segments of abdomen of male; aedeagus—b, dorsal; c, lateral; d, ventral views.

Elytra at base very slightly wider than prothorax. Umbone feeble. Colour and sculpturing as in prothorax, but with punctures a little coarser. Margins and epipleura of same colour as scutellum.

Pro- meso- and metasternum fuscous with purplish and bluish reflections. Shining. Ventral abdominal segments a little lighter, shining, with a few punctures. Last ventral with a distinct, smooth, shining concavity. Fore and middle femora fuscous, hind femora dark with distinct metallic reflections, alutaceous. Fore, middle, and hind tibiae rufotestaceous. All tarsi rufotestaceous except fifth joint of each which is fuscous. Undersurface and legs clothed with a few white hairs.

Aedeagus—Length 1.7 mm., width .4 mm. Amber coloured. Ventral surface with sides parallel until near subapical enlargement, apex rather broadly pointed. Surface flat until subapical enlargement when it slopes abruptly to near point; sloping surface formed of four elongated elevations, outer two of which are longest and most prominent. Basal opening with a very distinct rim. Dorsal surface with basal portion and middle convex, flattening toward apical third. A small circular concavity about middle, a larger, deeper, elongated concavity on apical third. Each side of apical 2/3 of larger cavity with well developed ridges blending into heavily chitinized point. Side walls of concavity and point (apex) superimposed on subapical enlargement. A series of fine transverse ridges between the concavities and on either side of circular cavity and for about 1/3 length of larger cavity. Ridges extend toward base on sides of tube. Floor and side walls of large cavity appear as three strap-shaped areas.

Female—Form, colour and sculpturing similar to that of male. Length 3.8 mm., width 2 mm. Front rougher and with more brassy reflections. Pre-

frontal carina broader. Interocular space .6 mm. Frontal tubercles more or less triangular, slightly convex, not smooth or polished as in male. The deep pit in middle of postfrons between tubercles wanting. Antennae with a fuscous blotch on first joint, white hairs not as abundant, otherwise as in male. Ventral segments not quite so dark and with greater reflections of blue and green.

Described from two specimens, a male and female, collected at Oak Grove St. Park, Iowa, July 25, 1928, by G. O. Hendrickson. Holotype, the female, deposited in the collection of Iowa State College of Agriculture and Mechanic Arts. Allotype in Canadian National Collection.

The species may be readily identified by its elongate oval form, bright blue-green upper surface, bicoloured light and dark brown antennae and legs, almost obliterated ante-basal impression, distinctly alutaceous thorax and elytra and its fine but distinct punctation.

There are three North American species having blue or green colured upper surfaces with light coloured legs and antennae and very faint ante-basal impressions—*opulenta* Horn, *ludoviciana* Fall, and *polita* Oliv. All three have entirely rufotestaceous antennae and legs. In addition *opulenta* is purplish in colour with body beneath piceous; *ludoviciana* is dark steel blue, subobsoletely alutaceous, thorax 1/3 wider than long, umbone prominent; *polita* is aeneous bronze, prothorax only 1/4 wider than long, body beneath reddish brown.

ANNOTATED LIST OF MISSISSIPPI RHOPALOCERA*

BY ROSS E. HUTCHINS

State College, Mississippi.

So little has been done or published on Mississippi Rhopalocera that it seems desirable to present a short list. In this list I have included only those species and forms which I have actually collected or seen in the collection at State College. Many of the specimens have been determined by Mr. F. H. Benjamin, and a good many have been compared with specimens in the Barnes collection. Most of the Hesperiidae were named by Dr. A. W. Lindsey. Without doubt many more species will be added as more collecting is done, especially in the southern portion of the state.

Papilio philenor L. Common about wild honeysuckle bushes in spring.

Papilio polyxenes Fabr. Uncommon.

Papilio cresphontes Cram. This species is common along the Gulf Coast, but is found also over most of the state.

Papilio glaucus L. Uncommon.

Papilio glaucus turnus L. Very common.

Papilio troilus L. Common in open woods in spring.

Papilio palamedes Dru. Rather common in southern sections.

Papilio marcellus Cram. Forms of this species common wherever pawpaw grows.

Pieris monuste L. Uncommon.

Pieris protodice Bdv. & Lec. Rather common.

Pieris rapae L. Very common.

Nathalis iole Bdv. Sometimes common.

*Contribution from Mississippi State College, and Mississippi State Plant Board.

Anthocharis genutia Fabr. Common in the hill sections in early summer.

Catopsilia eubule L. Common. Very often one sees large numbers of this species mingled with others on wet sand in streambeds. Many times I have taken a half dozen species with one sweep of the net in such a situation. This clustering is especially common on hot summer days. In September and October thousands of these butterflies are seen drifting toward the Southeast. I know of no especial reason for this, unless they are migrating toward Florida.

Catopsilia philea L. Rather common in southern sections, but rare in the northern part.

Zerene caesonia Stoll. Common. Often seen clustered with *Catopsilia eubule* L. in damp places.

Zerene caesonia gen. autumn *rosa* McNeill. Common in the fall.

Eurymus eurytheme Bvd. Forms of this are very common.

Eurymus philodice Godt. Common.

Eurema nicippe Cram. This butterfly is common in the open meadows, and borders of forests.

Eurema jucunda Bdv. Common in later summer. Generally found in pine forests. In flight the light under surfaces of the wings are shown most, so that the butterfly looks almost white. Whenever it is captured I am always surprised to find that I have a yellow butterfly.

Danaus archippus Fabr. Common.

Enodia portlandia Fabr. Rare.

Enodia creola Skin. Probably occurs along the Gulf Coast.

Neonympha gemma Hbn. Common in dense forests.

Cissia sosybius Fabr. Common. This is an unobtrusive little butterfly, inhabiting the dense semitropical forests and swamps.

Cercyoni alope Fabr. Doubtful occurrence. Specimen in State College collection with no label.

Heliconius charithonia L. Found along the Gulf Coast.

Colaenis julia Hbn. Doubtful occurrence. Specimen in State College collection with no label.

Dione vanillae L. Common.

Euptoieta claudia Cram. Very common in autumn.

Phyciodes phaon Edw. Rather common.

Phyciodes tharos Dru. Very common.

Polygonia interrogationis Fabr. Rather common in forests and on forest roads.

Polygonia interrogationis form *umbrosa* Lint. Common.

Polygonia comma Harris. Rare.

Aglais antiopa L. Rather common.

Vanessa atlanta L. Common.

Vanessa virginiensis Dru. Common.

Vanessa cardui L. Common.

Junonia coenia Hbn. Common.

Basilarchia astyanax Fabr. Uncommon.

Basilarchia archippus Cram. Not common.

Chlorippe celtis Bdv. & Lec. Very common. Found generally about hackberry trees. It has the habit of flying into the collector's face and making a

clicking sound.

Chlorippe clyton Bdv. & Lec. Not as common as the above.

Anaea andria Scud. Common.

Libythea bachmani Kirt. Common at times. I have seen hundreds clustered about the wet gravel near a flowing well on the Tombigbee River.

Calephelis virginiensis Gray. Not common. I took three specimens on a pine knoll at State College on August 25, 1931.

Atlides halesus Hbn. One in State College collection. One seen (?) on first collecting trip in Mississippi in September, 1929.

Strymon cecrops Fabr. Rather rare. Four specimens in State College collection taken between March 7 and June 26.

Strymon melinus Hbn. Common. This is the cotton square-borer which often does considerable damage to cotton in the South.

Strymon edwardsi Saund. Rare. One specimen in State College collection bearing label, "Ag. Col. Miss., June 1896."

Strymon liparops Bdv. & Lec. Doubtful occurrence. One badly mutilated specimen in State College collection bearing label, "Ag. Col. Miss., June 1896."

Mitoura damon gryneus Hbn. Common in early spring. I found it common during March on a knoll covered with prickley pear and surrounded by juniper.

Incisalia henrici G. & R. Rather common in spring.

Heodes hypophlaeas Bdv. Doubtful occurrence. One specimen in State College collection with no label.

Everes comyntas Godt. I have taken this common little blue early in March near State College.

Lycaenopsis pseudargiolus Bdv. & Lec. In all my collecting in Mississippi only two specimens have been taken. There are several specimens in the State College collection taken by F. H. Benjamin in June, 1920.

Goniurus proteus L. Rather common over most of the state.

Epargyreus tityrus Fabr. Common.

Achalarus lycidas A. & S. Common.

Cocceius pylades Scud. Common.

Thorybes daunus Cram. Very common.

Pyrgus tessellata Scud. Very common.

Pholisora catullus Fabr. .Very common.

Thanaos brizo somnus Lint. One specimen in State College collection determined by Dr. H. G. Dyar.

Thanaos martialis Scud. Not common.

Thanaos juvenalis Fabr. Rather common.

Thanaos horatius Scud. & Burg. Common.

Ancyloxypha numitor Fabr. Not common.

Ancyloxypha longleyi Frch. Rare.

Hylephila phylaeus Dru. Common.

Polites cernes Bdv. & Lec. Common.

Polites manataaqua Scud. Rather common.

Polites brettus Bdv. Common.

Atalopedes campestris Bdv. Very common.

Catia otho A. & S. Not very common.

Megistias fusca G. & R. Not common.
Lerema accius A. & S. Not common.
Lerodea eufala Edw. Uncommon.
Lerodea maculata Edw. Uncommon.
Calpodes ethlius Cram. Not common.
Prenes ocola Edw. Common along the Gulf Coast.

TWO UNDESCRIBED SPECIES OF THE OLD FAMILY SILPHIDAE WITH NOTES ON SOME CHARACTERS THAT HAVE BEEN USED TO DIVIDE THE GROUP*

BY W. J. BROWN
Ottawa, Ontario.

Pteroloma nebrioides n. sp.

Female. Length 5.5 mm.; width 2.8 mm. Dark reddish-brown, the antennae, legs, and side margins of the pronotum and elytra paler.

Head with an indistinctive fovea between the eyes; front with a few moderately coarse punctures, the punctures very irregularly distributed; vertex and occiput virtually impunctate. Antennae slightly stouter than in *forsstromii* Gyll.

Pronotum about two-thirds as long as wide, cordate, the sides broadly flattened and narrowly reflexed, the margins crenate, parallel in basal fifth, broadly arcuate anteriorly; the apical angles broadly rounded, the apex very feebly emarginate; basal angles rectangular, the base squarely truncate. Disk with a strong forvea in front of scutellum and a feeble forvea near each hind angle, the forveae with a few moderately coarse punctures, a few very feebly defined, indistinct punctures near the side margins, the convex portion of disk without sculpture.

Elytra seven-tenths as wide as long, the sides rather strongly arcuate and with a flattened margin fully as wide as that of the pronotum, the margin feebly serrate in basal third. Striae closely and coarsely punctate, the intervals without sculpture except the third and fifth which possess a few coarse punctures. Epipleura with coarse, very close punctures in basal three-fifths.

Metasternum and abdomen alutaceous, finely punctuate. Tarsi not dilated.

Male. Anterior and middle tarsi very feebly dilated.

Holotype—♀, Waterton, Alta., July 15, 1931, (F. S. Carr); No. 3539 in the Canadian National Collection, Ottawa.

Allotype—♂, same data, July 10, 1930.

Paratypes—7 ♂, 13 ♀, same data, July 9 and 10, 1930 and July 15, 1931.

The paratypes measure from 5 to 5.5 mm. in length. In several, there are a few coarse punctures on the middle of the pronotal disk.

This species has been confused with the European *forsstromii* Gyll. and was described and figured as the latter by Dr. Van Dyke (1928, Bull. Brook. Ent. Soc. XXXII, 21, pl. I, fig. 1). It is probable that all North American records of *forsstromii* are based on *nebrioides*. In *forsstromii*, the size is a little larger, and the body is much more elongate than in the American species. This difference in form is due to the elytra which, in *nebrioides*, are shorter, more

*Contribution from the Division of Systematic Entomology, Entomological Branch, Department of Agriculture, Ottawa.

strongly arcuate on the sides, and with the flattened margins much wider. The difference may be appreciated by comparing Dr. Van Dyke's figure with Reitter's figure of *forsstromii* (Fauna Germanica II, pl. 62, fig. 13). In addition to these differences and the difference in the antennae noted above, there are differences in sculpture. In *forsstromii,* the vertex and occiput bear numerous moderately coarse, irregularly distributed punctures, and the pronotum is punctate throughout except on a small area on each side of the median line, the punctures being coarse, deep, irregularly distributed, and close near all the margins.

In the holotype and two paratypes of *nebrioides,* and in the two specimens of *forsstromii* before me, there is a small, reddish, very feebly tumid area on each side of the vertex. These areas are very indistinct in fifteen specimens of *nebrioides* and are not present in four. I judge them to be the ocelli referred to by Dr. Hatch and several European authors. In his paper on the carrion beetles of Minnesota (1927, Univ. Minn. Agr. Exp. Sta. Techn. Bull. 48, 8 and 12), Dr. Hatch has transferred *Pteroloma forsstromii* Gyll. to the Omaliinae on account of its ocelli and has erected the genus *Apteroloma* for species included by other authors in *Pteroloma. Apteroloma,* lacking ocelli, he retained in the Silphinae. As noted above, the ocelli, if ocelli they be, are not always present in *nebrioides,* and Bondroit (1911, Ann. Soc. Ent. Belg. LV, 366) has stated that they are sometimes absent in *forsstromii.* The character, therefore, fails. The species of *Pteroloma* are very closely allied to those of *Apteroloma,* so closely that any system placing them in different subfamilies must fail. I doubt if the latter genus can be retained as distinct from *Pteroloma.*

It seems to me that there is nothing to be gained from revising the content of most of the subfamilies and families allied to the Silphinae and Staphylinidae in the present state of our knowledge. The arrangement of these groups presented in Leng's Catalogue of Coleoptera, imperfect as it is, will not be improved greatly until studies much more thorough than any made in the past have been completed. These studies must begin with species and proceed to genera and higher groups.

I might note in this connection that the character commonly used to separate the Silphinae from the Leiodidae is evanescent and of no value. Authors have followed Horn and Thomson in stating that the anterior coxal cavities are open behind in the Silphinae and closed in the Leiodidae. The character fails to separate the groups. When a coxa is removed, the cavity in most of the genera is seen as a fossa, the roof of which consists of a plate penetrated by a foramen and joining the prosternum with the episternum. In those Canadian genera with antennal grooves, in *Colenis impunctata* Lec., and in *Leiodes obsoleta* Mels., the posterior portion of this plate attains the plane of the posternal intercoxal process and the projecting portion of the episternum, joining them together and narrowly closing the cavity. The plate may be observed behind the coxa and is not emarginate there. In the more typical species of *Leiodes,* such as *horni* Hatch, *valida* Horn, and *assimilis* Lec., the structure is similar, but the plate is feebly emarginate on its posterior edge and so does not extend behind the coxa. In *Hydnobius substriatus* Lec. and *latidens* Lec., the plate is strongly emarginate behind and does not attain the plane of the intercoxal process and the projecting portion of the episternum. In *Hydnobius matthewsii* Cr., *strigilatus* Horn, and

simulator Br., the plate is much reduced, the emargination being very great and joining the foramen; the structure in these species does not differ from that found in *Pelatines, Necrophilus,* and several other genera now placed in the Silphinae.

There appears to be no character for separating the Silphinae and Leiodidae. However, when the characters of the groups have been carefully studied and properly evaluated, these groups, with their contents somewhat revised, will be found well characterized and quite distinct. It is possible too that such studies will show the Silphinae to be distinct from the Staphylinidae.

Catopocerus ulkei n. sp.

Female. Length 2 mm.; width .9 mm. Body oblong, parallel, brownish-red, strongly shining. Head three-fifths as wide as the pronotum, very finely and very sparsely punctulate, the front and clypeus without other sculpture, the vertex with indistinct strigulae which are transverse and oblique in direction. Antenna with the stem stout, the third segment as long as and scarcely less stout than the second; the fourth, fifth, sixth and eighth subspherical, equal, the seventh much larger.

Pronotum two-thirds as long as wide, widest before the base; very finely and very sparsely punctulate, strigulated throughout like the vertex, the strigulae not forming regular, closed cells.

Elytra parallel at base, without strigulae, at base punctulate, some of the punctules arranged in rows indicating the striae, the punctules of sides finer, the apical declivity without sculpture.

Ventral surface of thorax and abdomen without distinct sculpture; the intercoxal process of the first abdominal segment narrow. Tarsi not dilated.

Holotype—♀, District of Columbia, No. 3538 in the Canadian National Collection, Ottawa.

Paratypes—2♀, same data.

This species has been confused with *cryptophagoides* Mann. and was described under the latter name by Horn (1880, Trans. Am. Ent. Soc. VIII, 249; 1892, Trans. Am. Ent. Soc. XIX, 46). According to the original description of *cryptophagoides,* which was based on material from Sitka, Alaska, that species has subrugulose elytra. Before me are four specimens of the true *cryptophagoides* from the Queen Charlotte Islands, B. C., which possess this character but which differ from *ulkei* in the form of the body and antennae as well as in sculpture. In *cryptophagoides,* the body is wider and less parallel, being distinctly less than twice as long as wide, the head is much smaller, being slightly less than half as wide as the pronotum, and intercoxal process of the first abdominal segment is distinctly wider. The antennal stem is much more slender than in *ulkei;* the third segment is distinctly shorter and much more slender than the second; the fifth segment is much longer than the fourth or sixth and is quite similar to the third in size and form. The entire surface of the head is alutaceous; the pronotum is alutaceous, the impressed lines forming a mesh of subcircular, closed cells which are regularly distributed over the entire surface. The elytra are less finely punctate, the punctures showing no trace of serial arrangement, and the entire surface, except the extreme apex, is very finely, distinctly and transversely strigulated. The ventral surface of the body is alutacous.

BOOK NOTICE

Bibliographia Odonatologica. By Erick Schmidt, Berlin-Steglitz. Fritz Wagner, Vienna, xviii, Haizingergasse 4.

The announcement of this extensive project was published by the author in 1931, and now the first installment of the work has appeared (April 15, 1933). It consists of 116 pages, clearly printed in large type, on which are listed the titles of all papers on dragonflies, arranged under the authors' names in alphabetical order, from Aaron to Dobson. There is also a well-executed plate, showing portraits of five American authors. Several other installments are planned to appear, each to be accompanied by a plate. The final part will contain a classification of the bibliographical material in a series of indices, among the most important of which are a subject index, subdivided on a biological basis (e.g., zoogeography, anatomy, physiology, evolution, etc.), a chronological index, and an *index loci*, arranged according to the names of the periodicals or other channels of publication, the secondary arrangement being given chronologically under the authors' names.

Dr. Schmidt's work has evidently been done with the greatest of care and thoroughness. An attempt has been made to include every paper containing any reference to the order Odonata. The citations are fully and concisely given and, wherever possible, the dates of birth and death and other biographical details are given under each author's name.

The subscription price is 1.50 Reichsmark per sixteen page section and 1 Reichsmark per plate, only subscriptions to the entire work being accepted. These prices will be reduced to 1.20 RM and .80 RM respectively in the case of subscriptions received before the appearance of the second installment. As the issue of the remaining parts depends upon a considerable increase in the present list of subscribers, all students of Odonata are advised to subscribe without delay. The work will be indispensable to all who are seriously interested in the group and should also find a place in the library of every entomological laboratory.

E. M. Walker

Date of Mailing, Saturday, Oct. 7th.